



## **Aiding Designers to make Practitioner-like Interpretations of Life Cycle Assessment Results**

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## **PROGRAMME & ABSTRACTS BOOK**

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USING BIOLOGY AS A MODEL FOR SUSTAINABILITY: INSIGHTS FOR ECODESIGN AND BIOINSPIRED DESIGN PRACTITIONERS | Julia O'Rourke, Carolyn Conner Seepersad

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Numerous authors in the bioinspired design and ecodesign research communities conceive of biology as a model for sustainability and use biological systems, organisms, and features as analogies when designing environmentally friendly products and systems. The purpose of this paper is to dig deeper into the issue of sustainability in biology, to better understand the ways biology is – and is not – sustainable and discuss the implications of these findings for ecodesign and bioinspired design researchers and practitioners.

INFLUENCE OF INFORMATION AND KNOWLEDGE FROM BIOLOGY ON THE VARIETY OF TECHNICAL SOLUTION IDEAS | Helena Hashemi Farzaneh, Katharina Helms, Udo Lindemann

Technical University Munich, Germany

Bio-inspired design aims at the development of novel, creative solutions with the potential for innovative technical products. It implies the use of different information sources, such as research publications or videos, and knowledge from biology. The influence of information and knowledge from biology on the variety of solution ideas as one criterion for creativity remains to be examined. In this work, we therefore analyse the impact of information and knowledge from biology on the variety of solution ideas generated by pairs of biologists and mechanical engineers working in uni-and bi-disciplinary pairs. The results show a positive influence of information and knowledge from biology on the variety of solution ideas. Moreover, they indicate the need for a support of biologists and mechanical engineers to effectively increase the variety of solution ideas on different levels of abstraction.

BIOLOGICALLY INSPIRED FAULT ADAPTIVE STRATEGIES FOR ENGINEERED SYSTEMS

David Charles Jensen, Nicholas Huisman

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In nature, the continued survival of a species depends on the adaptability to unexpected environmental factors. While major mutations may lead to the selection of preferred traits in the long term, in the short term there are a variety of principles found in nature which are seen across biomes which enable individual organisms and organism groups to be adaptive. For complex, human engineered systems the ability to adapt to broad environmental and mission changes is a growing research topic. This paper presents the findings of a review of biological science to identify general strategies of fault adaption. These strategies are categorized and then represented using a formal engineering model-based representation. This work demonstrates the ability to identify natural fault adaptive principles, the ability to use these principles in a guided design process, and presents a validation framework for comparing performance of biologically inspired fault adaptive technologies.

COLLECTIVE BRAND IMAGERY WEAVE: CONNECTING BRAND VALUES TO PRODUCT CHARACTERISTICS USING PHYSICAL COMPLEX INSTALLATION

Maaïke Mulder-Nijkamp (1), Priscilla Chueng-Nainby (2),(3)

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Branding is almost fully embedded as a strategic asset. Companies must develop products with designs that not only appear attractive but also carry distinctive references, manifest in the values of the brand. However, those values are sometimes intangible and evoke different meaning between consumers. Therefore it is a challenging job to manipulate design features to elicit the ‘right’ associations, especially for novice designers. This paper discusses a workshop where we implemented a method based on the collective imagery framework to explore seven values (prestige, superior, quality, excitement, audacious, performance, simplicity). The method establishes an embodied common ground for co-designers to envision, enact and connect the complex network, which connects brand values to product characteristics. In the workshop participants were asked to create visions with each other by sharing personal stories. The physical structure built by participants to show their values in spatial structure. We conclude that it is useful to use physical installation to determine meanings of values that inform product characteristic for a brand to be recognisable.

AIDING DESIGNERS TO MAKE PRACTITIONER-LIKE INTERPRETATIONS OF LIFE CYCLE ASSESSMENT RESULTS | Praveen Uchil (1), Amaresh Chakrabarti (1), Peter Fantke (2)

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Detailed Life Cycle Assessment (LCA) provide tools to quantitatively illustrate the environmental impacts of a product throughout its life cycle. Effectively interpreting the results of a detailed LCA are fundamental for taking reliable decisions about evaluating design alternatives w.r.t environmental impact and for communicating the same across various actors. The goal of our research is to develop target specific interfaces to aid designers to make practitioner like interpretation of LCA results. In this paper we describe the challenges involved in practitioner like interpretation of LCA results and describe general requirement of a LCA interface to support effective (Practitioner –like) interpretation. We develop a novel questionnaire based evaluation method to identify the issues in LCA tools, faced by designers in pursuit of practitioner like interpretations. In order to describe underlying cause of these issues, we use two constructs derived from domain of information visualization, namely explanatory and exploratory mode of interfaces.

A MODEL OF LOST HABITS: TOWARDS A STRATEGY TO IMPROVE THE ACCEPTANCE OF PRODUCT SERVICE SYSTEMS | Hendrikus Schotman, Geke D.S. Ludden

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User acceptance is one of the largest barriers for the success of product-service systems (PSS). Often, PSS require a user to change his or her behaviour, which may conflict with existing habits. This results in non-acceptance of the PSS, which is disappointing for designers who aim to develop successful PSS. Research on acceptance of PSS has been focused on the context in which PSS could operate, and on how PSS should be designed and marketed, in order to trigger and stimulate behaviour change. These methods centre on the viewpoint that change is a necessity. However, change is difficult, because people tend to hold on to their habits. In this paper we will propose that habits can be used in the design process, for which we introduce the term “lost habits”. When people lose habits due to undesired events, they may be very motivated to accept something that is instrumental to restore their habits. A PSS that addresses these so-called lost habits, might therefore be successfully accepted. In this paper, we will present a model that builds on this point of view, and we will present an explorative study to find how this model can be used in the beginning of a design process.